SUPPLEMENTARY TABLES

Supplementary Table 1. Association of the risk factors of dementia and MMSE score in PD, DM and PD-DM patients.

Model	Predictor variables	B	SE	β	p	R^2	Adjusted R^2	F	p
PD	**FBG<5.00 (mmol/L)**	-1.052	0.433	-0.126	**0.016**				
	HCY>15.00 (μmol/L)	-1.336	0.595	-0.115	**0.026**				
	Age	-0.140	0.019	-0.376	**<0.001**	0.185	0.173	14.469	<0.001
	Cys C>0.95 (mg/L)	-0.908	0.452	-0.103	**0.046**				
	Hyperlipidemia	-1.232	0.641	-0.098	0.056				
PD-DM	**Fibrinogen>4.00 (g/L)**	-1.857	0.663	-0.174	**0.006**				
	LDL-C<2.00 (mmol/L)	-1.876	0.674	-0.173	**0.006**	0.290	0.275	19.383	<0.001
	Age	-0.171	0.032	-0.342	**<0.001**				
	SAE	-2.196	0.640	-0.216	**0.001**				
DM	**AST>40 (IU/L)**	-3.278	1.023	-0.141	**0.001**				
	Cys C>0.95 (mg/L)	-1.878	0.690	-0.119	**0.007**				
	Anxiety or depression	-1.579	0.531	-0.135	**0.003**	0.319	0.310	34.277	<0.001
	Male	-1.182	0.398	-0.131	**0.003**				
	Age	-0.163	0.015	-0.481	**<0.001**				

B- Unstandardized coefficient; β- Standardized coefficient; R² represents the model explanatory power with according standardized β weights, showing the contribution of each independent variable to the proposed model; SE- Standard Error; MMSE- mini mental state examination; PD- patients with Parkinson disease without type 2 diabetes mellitus; PD-DM- patients with Parkinson disease and type 2 diabetes mellitus; DM- type 2 diabetes mellitus without Parkinson disease; FBG- Fasting blood glucose; HCY- homocysteine; Cystatin C- Cys C; LDL-C- low density lipoprotein cholesterol; SAE- subcortical arteriosclerotic encephalopathy; AST- Aspartate transaminase.

Supplementary Table 2. Differences of risk factors among PDD, DMD and PD-DMD groups.

Clinical variables	PDD (n=31)	DMD (n=35)	PD-DMD (n=31)	p*	Multiple comparisons **
Age, years	69.0(59.0,79.0)	68.0(57.0,74.0)	79.0(72.0,84.0)	**<0.001**	**PD-DMD>PDD=DMD**
<55, n (%)	3(9.68)	7(20.00)	0	-	-
55–70, n (%)	16(51.61)	14(40.00)	5(16.13)	-	-
>70, n (%)	12 (38.71)	14(40.00)	26(83.87)	**<0.001**	**PD-DMD>PDD=DMD**
Male, n (%)	18(58.06)	27(77.14)	16(51.61)	0.080	-
PD duration, month	60(24,84)	-	36(12,72)	-	
Dementia, n (%)	31 (100.00)	35 (100.00)	31 (100.00)	0.094	-
Use of drugs, n (%)					
Atorvastatin	6(19.35)	14(40.00)	20(64.52)	**0.001**	**PD-DMD>PDD**
Metformin	-	14(40.00)	9(29.03)	-	-
Insulin	-	8(22.86)	14(45.16)	0.055	-
Acarbose	-	17(48.57)	18(58.06)	0.441	-
L-Dopa	28(90.32)	-	26(83.87)	-	-
MDS-UPDRS (I)	3.0(2.0,5.0)	-	5.0(3.0,6.0)	**0.006**	**PD-DMD>PDD**
MDS-UPDRS (II)	8.0(6.0,11.0)	-	14.0(12.0,18.0)	**<0.001**	**PD-DMD>PDD**
MDS-UPDRS (III)	17.0(15.0,23.0)	-	23.0(21.0,29.0)	**<0.001**	**PD-DMD>PDD**
MDS-UPDRS (Total)	26.0(24.0,38.0)	-	44.0(37.0,54.0)	**<0.001**	**PD-DMD>PDD**
H&Y	3.0(2.0,4.0)	-	3.0(3.0,4.0)	0.072	-
NMSS	26.0(17.0,32.0)	-	32.0(28.0,34.0)	**0.003**	**PD-DMD>PDD**
MMSE	15.0(13.0,17.0)	15.0(9.0,19.0)	13.0(11.0,17.0)	0.613	-
MoCA	12.0(9.0,14.0)	12.0(7.0,15.0)	9.0(8.0,13.0)	0.205	-
Anxiety or depression	17(54.84)	13(37.14)	19(61.29)	0.124	-
Vascular and inflammatory risk factors					
SBP mmHg	120.0(118.0,135.0)	146.0(128.0,153.0)	132.0(120.0,152.0)	-	-

DBP mmHg	80.0(78.0,81.0)	85.0(80.0,95.0)	78.0(69.0,87.0)	-	-
Smoking history, n (%)	2(6.45)	7(20.00)	3(9.68)	-	-
Drinking history, n (%)	0	5(14.29)	1(3.23)	-	-
BMI	23.0(22.0,25.0)	24.0(22.0,26.0)	24(21,25)	-	-
LDL-C (mmol/L)	2.5(2.3,3.2)	2.7(1.9,3.1)	1.9(1.6,3.0)	0.094	-
LDL-C<2.00 (mmol/L), n (%)	2(6.45)	12(34.29)	15(48.39)	**0.001**	**PD-DMD=DMD>PDD**
D-Dimer (mg/L)	0.6(0.3,1.1)	0.4(0.3,0.9)	0.6(0.4,1.4)	-	-
D-Dimer>0.50 (mg/L), n (%)	10(32.26)	8(22.86)	10(32.26)	0.618	-
Fibrinogen (g/L)	3.5(2.8,4.0)	3.3(3.0,4.6)	4.1(3.5,5.1)	**0.012**	**PD-DMD>PDD**
Fibrinogen>4.00 (g/L), n (%)	6(19.35)	9(25.71)	15(48.39)	**0.033**	**PD-DMD>PDD**
WBC (g/L)	6.1(5.0,7.2)	7.3(6.0,9.5)	7.4(6.1,9.9)	-	-
Lymphocyte (%)	30.7(24.2,34.8)	25.3(18.6,32.1)	20.5(12.2,28.0)	**0.001**	**PD-DMD<PDD**
Neutrophil (%)	58.6(52.5,67.5)	64.0(58.3,70.2)	71.5(61.6,82.8)	**<0.001**	**PD-DMD>PDD**
hs-CRP (mg/L)	0.6(0.6,2.0)	3.6(1.5,7.1)	4.5(0.7,47.1)	0.036	-
hs-CRP>3.00 (mg/L), n (%)	2(6.45)	11(31.43)	8(25.81)	**0.039**	**DMD>PDD**
Hyperlipidemia	7(22.58)	3(8.57)	2(6.45)	-	-
Brain infarction	13(41.94)	27(77.14)	26(83.87)	**0.001**	**PD-DMD=DMD>PDD**
SAE	9(29.03)	5(14.29)	18(58.06)	**0.001**	**PD-DMD>DMD**
WMLs, n (%)	12(38.71)	17(48.57)	18(58.06)	0.313	-
Fazekas 1	5(16.13)	2(5.71)	2(6.45)	-	-
Fazekas 2	7(22.58)	12(34.29)	15(48.39)	0.103	-
Fazekas 3	0	3(8.57)	1(3.23)	0.322	-
Metabolic risk factors					
AST>40(IU/L), n (%)	0	5(14.29)	3(9.68)	0.091	-
ALT	15.0(9.0,22.0)	22.0(15.0,28.0)	14.0(11.0,30.0)	-	-
Albumin	40.3(38.0,41.8)	39.3(36.2,42.9)	36.9(36.0,42.1)	0.204	-
Albumin<35.00 (g/L), n (%)	2(6.45)	4(11.43)	7(22.58)	0.187	-
Calcium (mmol/L)	2.3(2.2,2.4)	2.2(2.2,2.3)	2.2(2.1,2.3)	0.329	-
Calcium<2.10 (mmol/L), n (%)	5(16.13)	6(17.14)	8(25.81)	0.569	-
Potassium (mmol/L)	3.8(3.6,4.1)	3.9(3.6,4.0)	3.8(3.4,4.3)	0.911	-
MCV (fL)	92.7(91.1,97.4)	87.2(83.5,93.3)	89.9(88.2,93.2)	**<0.001**	**PDD>PD-DMD=DMD**
MCV>90.00 (fL), n (%)	25(80.65)	13(37.14)	14(45.16)	**0.001**	**PDD>PD-DMD=DMD**
HCY (μmol/L)	15.8(12.0,17.8)	11.3(8.5,15.3)	12.3(8.7,18.0)	-	-
HCY>15.00 (μmol/L), n (%)	9(29.03)	5(14.29)	5(16.13)	0.270	-
Hyperhomocysteinemia	4(12.90)	0	1(3.23)	0.041	-
Cys C (mg/L)	1.1(1.0,1.2)	1.0(0.9,1.1)	1.0(0.9,1.5)	0.551	-
Cys C>0.95 (mg/L), n (%)	15(48.39)	8(22.86)	7(22.58)	0.039	-
FBG (mmol/L)	4.7(4.3,5.1)	7.6(5.8,11.6)	7.1(6.1,10.0)	**<0.001**	**PD-DMD=DMD>PDD**
FBG<5.00 (mmol/L), n (%)	23(74.19)	5(14.29)	1(3.23)	**<0.001**	**PD-DMD=DMD<PDD**
HbA1c (%)	5.7(5.2,5.9)	7.3(6.3,8.9)	6.4(6.0,7.4)	-	-

PDD- patients with Parkinson disease with dementia; DMD- type 2 diabetes mellitus with dementia; PD-DMD- patients with Parkinson disease and type 2 diabetes mellitus and dementia; L-Dopa- Levodopa and Benserazide; MDS-UPDRS- Movement Disorder Society–Unified Parkinson's Disease Rating Scale; H&Y- the modified Hoehn and Yahr staging scale; NMSS- Non-Motor Symptoms Scale for Parkinson's Disease; MMSE- mini mental state examination; MoCA- Montreal Cognitive Assessment; SBP- systolic blood pressure; DBP- diastolic blood pressure; BMI- body mass index; LDL-C- low density lipoprotein cholesterol; WBC- White blood cell count; hs- CRP- hypersensitive C-reactive protein; SAE- subcortical arteriosclerotic encephalopathy; WMLs- White matter lesions; AST- Aspartate transaminase; ALT- Alanine transaminase; MCV- mean corpuscular volume; HCY- homocysteine; Cystatin C- Cys C; FBG- Fasting blood glucose; HbA1c- glycated hemoglobin. *The Bonferroni method was used to adjust the significance level to perform multiple testing. **If statistically significant, continuous variables were analyzed by Kruskal-Wallis test followed by post-hoc analysis with Bonferroni adjustment to compare differences among PDD, DMD and PD-DMD groups and were prior adjusted for age using multivariate linear regression. Mann-Whitney U test were used to compare differences between PDD and PD-DMD groups. Categorical parameters were analyzed using χ2-test with Bonferroni adjustment for multiple testing.

Supplementary Table 3. Multivariable logistic regression analysis for risk factors of dementia in PD patients.

(a)

Variables	Univariate		Multivariate model	
	OR (95%CI)	p	Adjusted OR (95% CI)	p
FBG<5.00 (mmol/L)	**2.704(1.171,6.241)**	**0.020**	**4.380(1.748,10.975)**	**0.002**
HCY>15.00 (μmol/L)	**2.684(1.156,6.231)**	**0.022**	**3.131(1.243,7.888)**	**0.015**
Hyperlipidemia	2.448(0.980,6.119)	0.055	**3.075(1.142,8.277)**	**0.026**
Age	1.035(1.000,1.071)	0.050	**1.043(1.003,1.084)**	**0.034**
Cys C>0.95 (mg/L)	**2.122(1.008,4.468)**	**0.048**	2.157(0.979,4.752)	0.056

(b)

Variables	Univariate		Multivariate model	
	OR (95%CI)	p	Adjusted OR (95% CI)	p
HCY>15.00 (μmol/L)	**2.684(1.156,6.231)**	**0.022**	**2.522(1.042,6.104)**	**0.040**
Hyperlipidemia	2.448(0.980,6.119)	0.055	**2.638(1.018,6.840)**	**0.046**
Age	1.035(1.000,1.071)	0.050	1.030(0.992,1.069)	0.124
Cys C>0.95 (mg/L)	**2.122(1.008,4.468)**	**0.048**	2.057(0.947,4.464)	0.068
Hypoglycaemic episodes (FBG≤3.9mmol/L)	1.594(0.186,13.690)	0.671	2.949(0.308,28.262)	0.348

PD- patients with Parkinson disease without type 2 diabetes mellitus; OR- odds ratio; CI- confidence interval; FBG- fasting blood glucose; HCY- homocysteine; Cys C- Cystatin C.

Supplementary Table 4. Multivariable logistic regression analysis for risk factors of dementia in DM patients.

Variables	Univariate		Multivariate model	
	OR (95% CI)	p	Adjusted OR (95% CI)	p
AST>40(IU/L)	**6.074(1.913,19.286)**	**0.002**	**6.472(1.147,36.533)**	**0.034**
Cys C>0.95 (mg/L)	**3.864(1.584,9.424)**	**0.003**	**4.905(1.399,17.206)**	**0.013**
Anxiety or depression	**3.239(1.535,6.833)**	**0.002**	**3.750(1.220,11.526)**	**0.021**
Male	**2.549(1.125,5.775)**	**0.025**	**3.480(1.109,10.918)**	**0.033**
Hypoglycaemic episodes (FBG≤3.9mmol/L)	**5.062(1.208,21.212)**	**0.027**	7.013(0.903,54.463)	0.063
Neutrophil (%)	**1.054(1.017,1.093)**	**0.004**	1.151(0.983,1.348)	0.080
Brain infarction	**5.511(2.429,12.500)**	**<0.001**	2.485(0.788,7.834)	0.120
Calcium<2.10(mmol/L)	**5.414(1.892,15.490)**	**0.002**	3.464(0.694,17.294)	0.130
Lymphocyte (%)	**0.935(0.896,0.974)**	**0.001**	1.144(0.960,1.364)	0.133
Potassium (mmol/L)	**0.381(0.149,0.977)**	**0.045**	0.500(0.145,1.725)	0.273
WMLs	**4.450(2.166,9.142)**	**<0.001**	2.812(0.439,18.002)	0.275
hs-CRP>3.00 (mg/L)	**2.512(1.160,5.439)**	**0.019**	1.850(0.573,5.974)	0.303
LDL-C<2.00(mmol/L)	2.103(0.996,4.440)	0.051	1.712(0.615,4.770)	0.303
SAE	**5.421(2.618,11.224)**	**<0.001**	1.460(0.249,8.548)	0.675
D-Dimer>0.50(mg/L)	**3.698(1.522,8.986)**	**0.004**	1.309(0.318,5.383)	0.709
Albumin<35.00(g/L)	**5.339(1.513,18.846)**	**0.009**	1.207(0.207,7.026)	0.834
Fibrinogen>4.00 (g/L)	**2.431(1.066,5.543)**	**0.035**	1.098(0.306,3.947)	0.886
Age	**1.033(1.005,1.062)**	**0.022**	0.998(0.957,1.042)	0.931

DM- patients with type 2 diabetes mellitus; OR- odds ratio; CI- confidence interval; AST- Aspartate transaminase; Cystatin C- Cys C; FBG- Fasting blood glucose; WMLs- White matter lesions; hs-CRP- hypersensitive C-reactive protein; LDL-C- low density lipoprotein cholesterol; SAE- subcortical arteriosclerotic encephalopathy.

Supplementary Table 5. Multivariable logistic regression analysis for risk factors of dementia in PD (with and without DM) patients and the interaction of risk factors with the existence of DM.

Variables	Univariate		Multivariate Model		Interactioon
	OR (95%CI)	p	Adjusted OR (95% CI)	p	p
Fibrinogen>4.00 (g/L)	**3.002(1.677,5.374)**	**<0.001**	**3.259(1.674-6.345)**	**0.001**	
With DM	**3.613(2.266,5.761)**	**<0.001**	**3.204(1.247,8.233)**	**0.016**	0.979
Without DM	**0.277(0.174,0.441)**	**<0.001**	**3.267(1.059,10.082)**	**0.039**	
LDL-C<2.00 (mmol/L)	**2.129(1.142,3.969)**	**0.017**	1.544(0.783,3.043)	0.210	
With DM	**2.586(1.594,4.197)**	**<0.001**	**3.347(1.305,8.585)**	**0.012**	**0.022**
Without DM	**0.387(0.238,0.627)**	**<0.001**	0.384(0.078,1.890)	0.239	
SAE	**2.458(1.428,4.231)**	**0.001**	1.566(0.848,2.894)	0.152	
With DM	**1.469(1.001,2.156)**	**0.049**	**3.952(1.566,9.971)**	**0.004**	**0.028**
Without DM	**0.681(0.464,0.999)**	**0.049**	0.855(0.312,2.343)	0.761	
FBG<5.00 (mmol/L)	1.100(0.638,1.895)	0.732	**2.364(1.153,4.848)**	**0.019**	
With DM	**0.108(0.067,0.175)**	**<0.001**	0.323(0.036,2.905)	0.313	**0.025**
Without DM	**9.232(5.728,14.880)**	**<0.001**	**5.116(1.879,13.931)**	**0.001**	
HCY>15.00 (μmol/L)	**1.925(1.005,3.687)**	**0.048**	1.724(0.848,3.503)	0.132	
With DM	0.907(0.554,1.1.486)	0.699	0.940(0.283,3.130)	0.920	0.163
Without DM	1.102(0.673,1.804)	0.699	**2.828(1.068,7.492)**	**0.036**	
Hyperlipidemia	1.302(0.610,2.780)	0.495	1.391(0.618,3.133)	0.425	
With DM	1.035(0.612,1.752)	0.898	0.717(0.146,3.506)	0.681	0.141
Without DM	0.966(0.571,1.635)	0.898	**2.996(1.048,8.561)**	**0.041**	
Diabetes	1.685(0.991,2.863)	0.054	1.168(0.573,2.384)	0.669	
Cys C>0.95 (mg/L)	1.350(0.775,2.353)	0.290	1.267(0.681,2.355)	0.455	
With DM	0.722(0.493,1.057)	0.094	0.467(0.155,1.405)	0.175	**0.022**
Without DM	1.385(0.946,2.028)	0.094	**2.360(1.014,5.495)**	**0.046**	
Age	**1.051(1.024,1.078)**	**<0.001**	**1.044(1.010,1.078)**	**0.010**	
With DM	**1.082(1.062,1.103)**	**<0.001**	1.059(0.999,1.123)	0.055	0.854
Without DM	**0.924(0.907,0.942)**	**<0.001**	**1.052(1.007,1.099)**	**0.024**	

PD- patients with Parkinson disease without type 2 diabetes mellitus; DM- type 2 diabetes mellitus without Parkinson disease; OR- odds ratio; CI- confidence interval; LDL-C- low density lipoprotein cholesterol; SAE- subcortical arteriosclerotic encephalopathy; FBG- fasting blood glucose; HCY- homocysteine; Cys C- Cystatin C.